Component of Statistics Canada Catalogue no. 82-003-X
Health Reports

Article

Gender differences in functional limitations among Canadians with arthritis: The role of disease duration and comorbidity

by D. Walter Rasugu Omariba

December, 2011

Statistics Canada Statistique Canada

Canada

Gender differences in functional limitations among Canadians with arthritis: The role of disease duration and comorbidity

by D. Walter Rasugu Omariba

Abstract

Background
Mechanisms underlying gender disparities in functional limitations among people with arthritis remain unclear. This study examined gender differences in the relationship between disease duration and comorbidity and functional limitations among people with arthritis.

Data and methods
Data were from the arthritis component of the 2009 Survey on Living with Chronic Diseases in Canada. People were considered to have functional limitations if they reported that arthritis limits them "a lot" in activities of daily living. Those with no functional limitations were the reference group. Gender-stratified weighted multivariate binary logistic regression analyses were conducted.

Results
In a fully adjusted multivariate analysis, only among women was time elapsed since the arthritis diagnosis associated with functional limitations. Disabling and life-threatening chronic conditions were associated with functional limitations in both genders. Among men, obesity and low household income were associated with higher odds of functional limitations, while living in British Columbia was associated with decreased odds. For women, smoking, not engaging in physical activity, residing in a non-Atlantic province, and having excess weight increased the odds of functional limitations, while habitual alcohol drinking decreased the odds.

Interpretation
Gender differences in the risks of reporting functional limitations were significant. These differences appear to be driven by duration of having arthritis, and disparities in health behavioural factors, household income and region of residence. The association between chronic conditions and functional limitations was similar for men and women.

Keywords
arthritis, activity limitations, functional limitations

Author
D. Walter Rasugu Omariba (1-613-951-6528; walter.omariba@statcan.gc.ca) is with the Health Analysis Division at Statistics Canada, Ottawa, Ontario K1A 0T6.

Arthritis is one of the most prevalent chronic illnesses in Canada.[1, 2] It is a major cause of functional limitations, dependency and health care use, and a contributing factor in lower participation in the labour force and in other activities.[3-6] In 2008, an estimated 15% of Canadians aged 12 or older—about 4 million people— reported having been diagnosed with arthritis.[7] The numbers are projected to increase to 20% (6.7 million) for people aged 15 or older by 2031.[8]

The prevalence of arthritis differs markedly by gender[9-11]: in 2008, 19.2% of women versus 12.6% of men had the condition.[8] Moreover, among those with arthritis, women are more likely than men to experience functional limitations.[12-14]

Relatively little research has focused on gender differences in functional limitations among people with arthritis,[3,15-19] especially the potential role of comorbidity, duration of the condition, and behavioural and socio-economic factors. Instead, population studies of its impact generally compare people with and without the condition.[20-23] As well, because it is costly and burdensome to respondents to ask disease-specific questions in general health surveys, previous studies have used data from surveys that included other chronic conditions, and therefore, lack detailed information about arthritis.[3, 12,17,24]

In 2009, Statistics Canada conducted the first cycle of the Survey on Living with Chronic Diseases in Canada (SLCDC) on behalf of the Public Health Agency of Canada. Respondents were people who had reported having a diagnosed chronic condition to the 2008 Canadian Community Health Survey (CCHS). The 2009 SLCDC focused on arthritis and hypertension, and covered issues related to chronic health conditions, including diagnosis, use of health services, medication use, and self-management. The SLCDC will be conducted every two years.

This study used the arthritis component of the 2009 SLCDC to examine gender differences in functional limitations, specifically, the role of disease duration and comorbidity. The study addresses four questions:

1. Are there overall differences in functional limitations between men and women? And are there gender differences in:
2. the influence of duration of disease on functional limitations?
3. the effect of chronic comorbidity on functional limitations?
4. the associations between health-related behaviours, socio-demographic and socio-economic factors and functional limitations?

Methods

Data source

The SLCDC data used in this study were collected in February and March, 2009, as a follow-up to the 2008 CCHS. The SLCDC targeted adults aged 20 or older living in private households in the ten provinces, who had reported to the 2008 CCHS that they had arthritis or hypertension that had been diagnosed by a health professional. The SLCDC excluded residents of the three territories, Indian reserves, Crown lands and institutions, and full-time members of the Canadian Forces.

To produce reliable national estimates, CCHS respondents were stratified by gender and age group (20 to 44, 45 to 64, 65 to 74, and 75 or older). A total of 7,100 individuals who had reported arthritis were selected from 13,459 CCHS respondents, using systematic sampling. To lessen the effect of out-of-scope and non-response—estimated at 10% and 20%, respectively—the sample was inflated by 1.4%. The SLCDC administered separate questionnaires on arthritis and hypertension; to reduce response burden, selected respondents received only one questionnaire. Interviews were conducted using computer-assisted telephone interviewing.

At the time of SLCDC data collection, 17% of the CCHS respondents who had been selected on the basis of having reported arthritis failed to meet all the inclusion criteria. These criteria required that: arthritis had been diagnosed by a health professional; symptoms be present at the time of the SLCDC; and the respondent reside in Canada. Of the 5,820 individuals eligible for inclusion, 4,565 (78.4%) were successfully interviewed and met the study inclusion criteria. Details about the survey have been reported elsewhere.[25] The 2008 CCHS contained background information on the respondents, while the SLCDC provided details about arthritis.

Variables

Outcome variable

The presence of the disease in the selected "arthritis sample" of the SLCDC was verified by re-asking the CCHS question about diagnosis by a health professional, age at diagnosis and at the onset of symptoms, the type of arthritis, and whether their immediate family had a history of arthritis. Functional limitations, hereafter referred to as "limitations," were identified by self-reported activity limitations attributable to arthritis. As an outcome measure, limitations is a composite variable derived from responses to questions about the extent to which, in the past month, arthritis limited routine activities such as bathing or dressing, getting around the house, doing household chores, running errands and shopping and participating in recreational and social activities. Response categories were "a lot," "a little," and "not at all." Respondents who answered "a lot" were considered functionally limited.

Independent variables

The analysis examined the effects of selected factors known to influence health outcomes: disease duration, co-morbid chronic conditions, BMI, smoking, alcohol use, physical activity, socio-demographic characteristics (age, gender, marital status, region of residence), and socio-economic characteristics (household income, education). Disease duration was defined as time elapsed since the arthritis diagnosis. Because of its skewed distribution, disease duration was log-transformed to approximate normality. It was modeled as an interval level measure.

Comorbidity was determined from the questions about chronic conditions. Respondents were instructed that chronic conditions (including arthritis) were conditions that had lasted or were expected to last for at least six months and had been diagnosed by a health professional. Consistent with the literature,[26] chronic conditions were categorized as nondisabling (asthma, high blood pressure, migraine headaches, stomach or intestinal ulcers, urinary incontinence); disabling (back problems excluding arthritis/fibromyalgia, bowel disorders/Crohn's Disease or colitis, chronic bronchitis or emphysema, and Alzheimer's disease or other dementia); and life-threatening (diabetes, heart disease, cancer, and effects of stroke). For each category, a count variable was created indicating the number of co-morbid conditions reported by the respondents.

Smoking status was based on past and current smoking behaviour: never, current, or former smoker. Never smokers were people who reported never having smoked a whole cigarette, and former occasional or daily smokers who had smoked fewer than 100 cigarettes in their life. Current smokers were people who reported smoking at least 100 cigarettes and were currently smoking daily or occasionally. Former smokers were daily or occasional smokers who had smoked at least 100 cigarettes, but had quit.

Based on reported alcohol consumption during the 12 months before the 2008 CCHS, respondents were classified as nondrinkers, habitual drinkers, or occasional drinkers. Nondrinkers were those who reported not drinking in the past year. Habitual drinkers were those who reported consuming alcohol at least once weekly. Occasional drinkers were those who reported consuming alcohol less than once weekly.

Physical activity level was derived from information reported about leisure-time activities in the 12 months before the survey and the energy expenditure (EE) associated with those activities (kilocalories expended per kilogram of

bodyweight per hour of activity). To calculate an average daily EE for an activity, the estimate was divided by 365. Respondents were grouped into three categories based on their average daily EE summed over all activities: active (EE of 3 or more kcal/kg/per day), moderate (EE of 1.5 to 2.9 kcal/kg/per day), and inactive (EE of less than 1.5 kcal/kg/per day).

BMI was calculated from self-reported height and weight (weight in kilograms/height in metres squared). Based on their BMI, respondents were classified as: normal weight (24.9 kg/m^2 or less), overweight (25 to 29.9 kg/m^2), and obese (30 kg/m^2 or more).

Age was grouped into three ranges: 20 to 54, 55 to 74, and 75 or older.

Marital status was categorized as married/common-law, widowed/divorced/separated, and never married.

Because small sample sizes precluded analysis at the provincial level, five geographic regions were defined: Atlantic (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick), Quebec, Ontario, Prairies (Alberta, Manitoba, Saskatchewan), and British Columbia.

Three education categories were created based on the respondent's highest level of attainment: less than secondary school graduation, secondary school graduation or some postsecondary, and postsecondary graduation.

Total household income in 2007, adjusted for household size, was used to identify two income levels. The low-income level was defined as incomes less than $30,000 for households of two, less than $40,000 for households of three or four, and less than $60,000 for households of five or more. The high-income level was defined as incomes above these cut-offs for a given household size. A third category comprised people who did not state their income—about 13% of the sample.

Analytical techniques

With SAS software (version 9.1), univariate analyses were used to estimate the characteristics associated with limitations. Gender differences in the characteristics of people with arthritis were evaluated by t- and χ^2 tests as appropriate. The outcome variable has two categories, and therefore, weighted binary logistic regression was used. People without limitations were defined as the reference group. Two gender-stratified models were estimated. The first included duration of arthritis and number of chronic conditions, examined separately, to which the other independent variables were added in the second model. Binary logistic regression was conducted using SAS-callable Sudaan (version 10). All independent variables in this study were tested for multicollinearity, and none violated collinearity assumptions.

Starting with the share weights from the 2008 CCHS, Statistics Canada developed weights for the 2009 SLCDC to reflect whether a respondent received an arthritis or hypertension questionnaire, and to account for sample design, out-of-scope units, and non-respondents including those who did not consent to share and link their survey information. The bootstrap method was used to calculate variance on the estimates.[25]

Results

Characteristics of people with arthritis

A higher percentage of women (63%) than men (37%) reported having been diagnosed with arthritis (Table 1). While about half of men and women with arthritis were in the 55 to 74 age range, a significantly higher percentage of women than men were aged 75 or older (22% versus 16%). Compared with men, women with arthritis were significantly more likely to report having at least one limitation (36% versus 27%). Women with arthritis had it significantly longer than their male counterparts: about 13 years compared with 11 years. As well, the mean number of nondisabling chronic conditions was significantly higher among women than men. No significant differences between men and women emerged for disabling and life-threatening chronic conditions.

What is already known on this subject?

- Arthritis is one of the most prevalent chronic illnesses in Canada and a leading cause of functional limitations.
- Although gender disparities in functional limitations among people with arthritis are well documented, the underlying reasons are less well understood.

What does this study add?

- The data focus exclusively on people with arthritis, and thus allow a more thorough examination of issues related to the disease.
- Obese men and those in low-income households faced higher risks of having functional limitations compared with those of normal weight and those in high-income households.
- Men in British Columbia had lower odds of functional limitations compared with men in the Atlantic region.
- Women who were smokers, did not engage in physical activity, resided in a non-Atlantic province, and had excess weight had higher odds of functional limitations compared with women who did not smoke, engaged in physical activity, lived in the Atlantic region, and had normal weight.

Differences were also evident in the other selected characteristics. For example, a higher percentage of women than men were physically inactive (60% versus 52%). Men (57%) were more likely than women (29%) to consume alcohol regularly. Just over a quarter (27%) of men and women were obese, but men were more likely than women to be overweight (46% versus 35%). Men were more likely than women to

Table 1
Percentage distribution of characteristics of respondents with arthritis, by gender, household population, Canada excluding territories, 2008/2009

Characteristic	Men			Women		
	Sample count	Weighted estimate '000	%	Sample count	Weighted estimate '000	%
Total†	**1,674**	**1,310**	**37.0***	**2,881**	**2,233**	**63.0**
Health and health-related factors						
Limited because of arthritis	485	355	27.1*	948	800	35.8
Years with arthritis (mean number)	11.5	10.7	..	13.8	13.1	..
Chronic conditions (mean number)						
Disabling	0.55	0.59	..	0.67	0.68	..
Nondisabling	0.55	0.70*	..	0.80	0.91	..
Life-threatening	0.35	0.37	..	0.35	0.37	..
Smoking						
Never	282	225	17.2*	1,037	873	39.1
Former	998	769	58.7*	1,332	962	43.1
Current	394	315	24.1*	512	398	17.8
Alcohol use						
Nondrinker	325	221	16.9*	856	744	33.3
Occasional	461	344	26.3*	1,178	844	37.8
Habitual	888	744	56.8*	847	646	28.9
Physical activity						
Active	376	280	21.4	483	382	17.1
Moderate	413	349	26.6	657	502	22.5
Inactive	885	681	52.0*	1,741	1,349	60.4
Body mass index (BMI)						
Normal	522	362	27.7*	1,164	839	37.6
Overweight	719	599	45.7*	955	790	35.4
Obese	433	349	26.6	762	604	27.0
Socio-demographic factors						
Age group						
20 to 54	469	448	34.2	590	618	27.7
55 to 74	850	655	50.0	1,478	1,128	50.5
75 or older	355	207	15.8*	813	487	21.8
Marital status						
Married/Common-law	1,127	1,010	77.1*	1,415	1,386	62.1
Widowed	154	74	5.6*	837	429	19.2
Divorced/Separated	204	114	8.7	421	249	11.1
Never married	189	112	8.6	208	170	7.6
Region						
Atlantic	280	138	10.5	442	218	9.8
British Columbia	183	169	12.9	321	250	11.2
Ontario	631	617	47.1	1,123	1,032	46.2
Prairies	362	200	15.2	593	371	16.6
Quebec	218	185	14.2	402	362	16.2
Socio-economic factors						
Education						
Less than secondary graduation	466	302	23.1	899	593	26.5
Secondary graduation/Some postsecondary	305	226	17.3*	642	582	26.1
Postsecondary graduation	903	781	59.7*	1,340	1,058	47.4
Household income						
Low	454	288	22.0*	1,098	646	28.9
High	1,092	896	68.4*	1,435	1,261	56.5
Missing	128	126	9.6*	348	326	14.6

† percentage of men or women in total arthritis sample
* significantly different from estimate for women ($p<0.05$)
.. not applicable
Note: The analysis excludes 10 women for whom BMI was not calculated (they were pregnant or did not report their pregnancy status).
Sources: 2008 Canadian Community Health Survey; 2009 Survey of Living with Chronic Diseases in Canada.

be married or living common-law (77% versus 62%) and to have completed postsecondary education (60% versus 47%).

Bivariate analysis: disease duration and comorbidity

The unadjusted results of the binary logistic regression show a strong positive association between duration of arthritis and limitations among men (odds ratio (OR)=1.27) and women (OR=1.30) (Tables 2 and 3; Model 1).

Disabling and life-threatening conditions were also significantly associated with limitations among men and women (Tables 2 and 3; Model 1). However, nondisabling conditions were associated with limitations only among women (Table 3; Model 1). For men, the risk of limitations increased by 91% for each additional disabling chronic condition; for women, the increase was 86%.

Multivariate analysis

In multivariate analyses that accounted for the effects of all selected variables, the association between duration of arthritis and limitations was no longer significant among men, but it remained significant among women (Tables 2 and 3; Model 2). For men, disabling and life-threatening conditions were still associated with limitations, although the odds for disabling chronic conditions were slightly attenuated. For women, disabling and life-threatening conditions remained significant, but nondisabling conditions did not.

Several other factors were associated with limitations. Men who were obese or lived in a low-income household had significantly higher odds of limitations. For men in British Columbia, the odds of limitations were significantly lower, compared with their counterparts in the Atlantic region.

For women with arthritis, smoking, physical inactivity, excess weight, and residing outside the Atlantic region were associated with higher odds of limitations. For example, compared with women of normal weight, overweight

Table 2
Unadjusted and adjusted odds ratios (OR) relating selected characteristics to functional limitations among men aged 20 or older with arthritis, household population, Canada excluding territories, 2008/2009

Characteristic	Model 1			Model 2		
	Unadjusted OR	95% confidence interval		Adjusted OR	95% confidence interval	
		from	to		from	to
Health and health-related factors						
Log years with arthritis	1.27*	1.04	1.56	1.18	0.95	1.46
Chronic conditions						
Disabling[2]	1.91*	1.37	2.65	1.80*	1.28	2.52
Nondisabling[2]	1.06	0.80	1.40	0.78	0.57	1.08
Life-threatening[2]	1.51*	1.10	2.07	1.54*	1.08	2.20
Smoking						
Never[1]	...	...	...	1.00	...	...
Former	...	...	...	1.33	0.74	2.38
Current	...	...	...	1.28	0.70	2.32
Alcohol use						
Nondrinker[1]	...	...	...	1.00	...	...
Occasional	...	...	...	0.86	0.46	1.59
Habitual	...	...	...	0.93	0.56	1.55
Physical activity						
Active[1]	...	...	...	1.00	...	...
Moderate	...	...	...	0.76	0.41	1.41
Inactive	...	...	...	1.57	0.93	2.66
Body mass index (BMI)						
Normal[1]	...	...	...	1.00	...	...
Overweight	...	...	...	1.21	0.75	1.94
Obese	...	...	...	1.81*	1.06	3.09
Socio-demographic factors						
Age group						
20 to 54[1]	...	...	...	1.00	...	...
55 to 74	...	...	...	0.88	0.50	1.55
75 or older	...	...	...	0.57	0.30	1.08
Marital status						
Married/Common-law[1]	...	...	...	1.00	...	...
Widowed	...	...	...	1.24	0.52	2.97
Divorced/Separated	...	...	...	1.07	0.53	2.18
Never married	...	...	...	1.70	0.93	3.09
Region						
Atlantic[1]	...	...	...	1.00	...	...
British Columbia	...	...	...	0.46*	0.21	1.00
Ontario	...	...	...	0.96	0.55	1.66
Prairies	...	...	...	1.16	0.64	2.09
Quebec	...	...	...	0.95	0.50	1.80
Socio-economic factors						
Education						
Less than secondary graduation	...	...	...	1.07	0.64	1.78
Secondary graduation/Some postsecondary	...	...	...	1.31	0.77	2.25
Postsecondary graduation[1]	...	...	...	1.00	...	...
Household income						
Low	...	...	...	1.74*	1.03	2.92
Missing	...	...	...	0.87	0.42	1.80
High[1]	...	...	...	1.00	...	...

[1] reference category
[2] modelled as continuous variables
* significantly different from estimate for reference category ($p<0.05$)
... not applicable
Note: Because of rounding, odds ratio with 1.00 as upper confidence limit is statistically significant.
Sources: 2008 Canadian Community Health Survey; 2009 Survey of Living with Chronic Diseases in Canada.

and obese women were each 61% more likely to have limitations. Women in British Columbia, Ontario, the Prairies, and Quebec had significantly higher odds of limitations compared with those in the Atlantic region. On the other hand, occasional or regular alcohol consumption was associated with lower odds of limitations.

Discussion

This study showed clear differences between men and women in the association of disease duration and comorbidity with the risk of having arthritis-related functional limitations. For women, but not men, the number of years with arthritis remained significantly related to the risk of functional limitations, even when behavioural, socio-demographic and socio-economic characteristics were taken into account. Also, the impact of arthritis on limitations manifests as early as the first year of having the disease. Research indicates that arthritis duration is associated with disease severity, joint destruction and functional capacity; without intervention outcomes tend to worsen over time.[27,28]

In the fully adjusted models, disabling and life-threatening chronic conditions were significantly associated with limitations among both men and women, and the strength of association was similar. These results appear to differ from those of other studies on gender differences in the prevalence of chronic conditions and their impacts.[13,15,24,29,30] Those studies showed that women had a higher prevalence of both disabling and nondisabling chronic conditions and were more likely to experience limitations as a result. For example, a prospective study among people with arthritis found that functional decline was more frequent among women than men; these gender differences were largely attributable to comorbid conditions including diabetes, history of stroke, depressive symptoms and cognitive and vision impairment.[13] Murtagh and Hubert found that women were more likely than men to report limitations, largely owing to differences in disability-related health conditions.[24]

Table 3
Unadjusted and adjusted odds ratios (OR) relating selected characteristics to functional limitations among women aged 20 or older with arthritis, household population, Canada excluding territories, 2008/2009

	Model 1			Model 2		
		95% confidence interval			95% confidence interval	
Characteristic	Unadjusted OR	from	to	Adjusted OR	from	to
Health and health-related factors						
Log years with arthritis	1.30*	1.10	1.52	1.27*	1.06	1.52
Chronic conditions						
Disabling‡	1.86*	1.33	2.60	1.63*	1.22	2.19
Nondisabling‡	1.48*	1.20	1.82	1.21	0.99	1.49
Life-threatening‡	1.48*	1.04	2.11	1.34*	1.01	1.76
Smoking						
Never†	...	...	...	1.00	...	...
Former	...	...	...	1.11	0.71	1.74
Current	...	...	...	1.72	1.03	2.88
Alcohol use						
Nondrinker†	...	...	...	1.00	...	...
Occasional	...	...	...	0.67*	0.46	1.00
Habitual	...	...	...	0.43*	0.28	0.66
Physical activity						
Active†	...	...	...	1.00	...	...
Moderate	...	...	...	1.32	0.76	2.30
Inactive	...	...	...	1.78*	1.12	2.82
Body mass index (BMI)						
Normal†	...	...	...	1.00	...	...
Overweight	...	...	...	1.61*	1.03	2.51
Obese	...	...	...	1.61*	1.07	2.42
Socio-demographic factors						
Age group						
20 to 54†	...	...	...	1.00	...	...
55 to 74	...	...	...	0.73	0.49	1.09
75 or older	...	...	...	0.86	0.50	1.47
Marital status						
Married/Common-law†	...	...	...	1.00	...	...
Widowed	...	...	...	1.38	0.91	2.09
Divorced/Separated	...	...	...	0.84	0.53	1.34
Never married	...	...	...	1.09	0.64	1.84
Region						
Atlantic†	...	...	...	1.00	...	...
British Columbia	...	...	...	1.94*	1.13	3.33
Ontario	...	...	...	2.06*	1.30	3.25
Prairies	...	...	...	1.63*	1.03	2.60
Quebec	...	...	...	2.18*	1.28	3.71
Socio-economic factors						
Education						
Less than secondary graduation	...	...	...	0.86	0.59	1.23
Secondary graduation/Some postsecondary	...	...	...	1.53	0.99	2.37
Postsecondary graduation†	...	...	...	1.00	...	...
Household income						
Low	...	...	...	1.08	0.75	1.53
Missing	...	...	...	0.62	0.36	1.06
High†	...	...	...	1.00	...	...

† reference category
‡ modelled as continuous variables
* significantly different from estimate for reference category ($p<0.05$)
... not applicable
Note: Because of rounding, odds ratio with 1.00 as upper confidence limit is statistically significant.
Sources: 2008 Canadian Community Health Survey; 2009 Survey of Living with Chronic Diseases in Canada

Nonetheless, the findings of this study support research suggesting that people with arthritis require comprehensive disease management that takes account of the added burden of other chronic conditions.[31,32]

Consistent with earlier research,[14,16,17] the influence of the other selected factors on functional limitations also differed by gender. Low household income was significant only for men. Physical inactivity, smoking, regular alcohol consumption, and overweight were significant only for women. Obesity was significant for both sexes. The association with region of residence differed for men and women.

The better health of occasional and habitual drinkers compared with nondrinkers deserves comment. This study assessed only the frequency, not the amount, of alcohol consumed. While consuming large amounts of alcohol has negative health effects,[33,34] moderate consumption is associated with better health outcomes, including an increase in bone density that can delay the onset of physical limitations.[35]

Limitations

This study has several limitations. First, the data are cross-sectional, so causality cannot be inferred. Second, the data are self-reported; no other sources were available for validation. Third, because the SLCDC is a follow-up survey, it is possible that the responses were affected by learning effects and the collection period. Assessing possible response bias is beyond the scope of this study, but it is warranted for follow-up surveys such as the SLCDC.

Fourth, this study examined only one component of arthritis disability—functional *limitations*. Another important component is dependence on others for activities of daily living—functional *dependency*. Limitation and dependency are not mutually exclusive; rather, they are part of a continuum of a person's health. However, SLCDC respondents were not asked if their dependence on others was attributable to arthritis. To provide a more complete picture of the

impact of chronic conditions, future rounds of the SLCDC might explore the potential of including questions about dependency directly attributable to a given condition.

Conclusion

The SLCDC data are well suited for studying quality of life, limitations, and health behaviours and outcomes among people with arthritis. Examining the association between arthritis and activity limitations indicates the types of intervention people with arthritis may need to remain functionally independent. An understanding of the impact of disease duration could help identify the optimal time to introduce interventions that would help to mitigate the effects of the disease. Similarly, insight into the role of comorbidity could inform the design of programs considering the added burden of other chronic conditions. Surveys focusing on specific chronic conditions provide essential details about the impact of those conditions, coping strategies among patients and health care use, all necessary for the formulation of disease-specific interventions. ■

References

1. Perruccio AV, Power JD, Badley EM. Revisiting arthritis prevalence projections: it's more than just an aging of the population. *Journal of Rheumatology* 2006; 33: 1856-62.
2. Kopec JA, Rahman MM, Sayre EC, et al. Trends in physician-diagnosed osteoarthritis incidence in an administrative database in British Columbia, Canada, 1996-1997 through 2003-2004. *Arthritis Care and Research* 2008; 59(7): 929-34.
3. Badley EM, Rothman LM, Wang PP. Modeling physical dependence in arthritis: the relative contribution of specific disabilities and environmental factors. *Arthritis Care and Research* 1998; 11(5): 335-45.
4. Fautrel B, Hilliquin P, Rozenberg S, et al. Impact of osteoarthritis: results of a nationwide survey of 10,000 patients consulting for OA. *Joint Bone Spine* 2005; 72: 235-40.
5. MacKay C, Canizares M, Davis AM, Badley EM. Health care utilization for musculoskeletal disorders. *Arthritis Care and Research* 2010; 62(2): 161-9.
6. Chorus AM, Miedema HS, Wevers CJ, van Der Linden S. Labor force participation among patients with rheumatoid arthritis. *Annals of Rheumatic Diseases* 2000; 59: 549–54.
7. Statistics Canada. *Healthy People, Healthy Places* (Catalogue 82-229) Ottawa: Ministry of Industry, 2010. Available at: http://www.statcan.gc.ca/pub/82-229-x/82-229-x2009001-eng.htm. Accessed July 7, 2010.
8. Lagacé C, Perrucio A, Degano C, Nichol M. What is arthritis and how common is it. In: Public Health Agency of Canada, Arthritis Consumer Experts, Arthritis Community Research & Evaluation Unit, et al., eds. *Life with Arthritis in Canada: A Personal and Public Health Challenge*. Ottawa: Public Health Agency of Canada, 2010.
9. Verbrugge LM, Patrick DL. Seven chronic conditions: their impact on US adults' activity levels and use of medical services. *American Journal of Public Health* 1995; 85(2): 173-82.
10. Wang PP, Elsbett-Koeppen R, Geng G, Badley EM. Arthritis prevalence and place of birth: findings from the 1994 Canadian National Population Health Survey. *American Journal of Epidemiology* 2000; 152(5): 442-5.
11. Dunlop DD, Manheim LM, Song J, Chang RW. Arthritis prevalence and activity limitations in older adults. *Arthritis and Rheumatology* 2001; 44(1): 212-21.
12. Badley EM, Ansari H. Arthritis and arthritis-attributable activity limitations in the United States and Canada: A cross-border comparison. *Arthritis Care and Research* 2010; 62(3): 308-15.
13. Dunlop DD, Semanik P, Song J, et al. Risk factors for functional decline in older adults with arthritis. *Arthritis and Rheumatology* 2005; 52(4): 1274-82.
14. Theis KA, Helmick CG, Hootman JM. Arthritis burden and impact are greater among U.S. women than men: intervention opportunities. *Journal of Women's Health* 2007; 16(4): 441-53.
15. Louie GH, Ward MM. Sex disparities in self-reported physical functioning: true differences, reporting bias, or incomplete adjustment for confounding? *Journal of the American Geriatric Society* 2010; 58: 1117-22.
16. Allaire SH. Gender and disability associated with arthritis: differences and issues. *Arthritis and Rheumatism* 1996; 9: 435–40.
17. Peek MK, Coward RT. Gender differences in the risk of developing disability among older adults with arthritis. *Journal of Aging and Health* 1999; 11: 131-50.
18. Dunlop DD, Manheim LM, Sohn MW, et al. Incidence of functional limitation in older adults: The impact of gender, race, and chronic conditions. *Archives of Physical Medicine and Rehabilitation* 2002; 83: 964-71.
19. Yount KM, Agree EM. Differences in disability among older women and men in Egypt and Tunisia. *Demography* 2005; 42(1): 169-87.
20. Wilkins K, Park E. Chronic conditions, physical limitations and dependency among seniors living in the community. *Health Reports* 1996; 8(3): 7-15.
21. Verbrugge LM, Juarez L. Profile of arthritis disability. *Public Health Reports* 2001, 116(Suppl. 1): 157-79.
22. Gilmour H, Park J. Dependency, chronic conditions and pain in seniors. *Health Reports* 2005; 16(Suppl.): 21-31.
23. Shih M, Hootman JM, Kruger J, Helmick CG. Physical activity in men and women with arthritis: National Health Interview Survey, 2002. *American Journal of Preventive Medicine* 2006; 30(5): 385-93.
24. Murtagh KN, Hubert HB. Gender differences in physical disability among an elderly cohort. *American Journal of Public Health* 2004; 94: 1406-11.
25. Statistics Canada. *Survey on Living with Chronic Diseases in Canada – User Guide*. Ottawa: Statistics Canada, 2009.
26. Ferraro KF, Wilmonth JM. Measuring morbidity: disease counts, binary variables, and statistical power. *Journal of Gerontology: Social Sciences* 2000; 55: S173-89.
27. Radner H, Smolen JS, Aletaha D. Impact of comorbidity on physical function in patients with rheumatoid arthritis. *Annals of Rheumatic Diseases* 2010; 69: 536-41.
28. Drossaers-Bakker KW, de Buck M, van Zeben D, et al. Long-term course and outcome of functional capacity in rheumatoid arthritis: the effect of disease activity and radiologic damage over time. *Arthritis and Rheumatism* 1999; 42: 1854-60.
29. Kulminski AM, Culminskaya IV, Ukraintseva SV, et al. Sex-specific health deterioration and mortality: The morbidity-mortality paradox over age and time. *Experimental Gerontology* 2008, 43(12): 1052-7.

30. Rieker PP, Bird C. Sociological explanations of gender differences in mental and physical health. In: Bird CE, Conrad P, Fremont AM, eds. *Handbook of Medical Sociology. Fifth Edition*. Upper Saddle River, New Jersey: Prentice Hall, 2000: 98-113.

31. Zhao G, Ford ES, Li C et al. Disability and its correlates with chronic morbidities among U.S. adults aged 50—<65 years. *Preventive Medicine* 2009; 48: 117-21.

32. Welsing PMJ, van Gestel AM, Swinkels HL, et al. The relationship between disease activity, joint destruction, and functional capacity over the course of rheumatoid arthritis. *Arthritis and Rheumatism* 2001; 44(9): 2009-17.

33. Guallar-Castillón P, Rodríguez-Artalejo F, Gañán LD, et al. Consumption of alcoholic beverages and subjective health in Spain. *Journal of Epidemiology and Community Health* 2001; 55: 648-52.

34. Brown AF, Ang A, Pebley AR. The relationship between neighbourhood characteristics and self-rated health for adults with chronic conditions. *American Journal of Public Health* 2007; 97: 926-32.

35. Reid MC, Van Ness PH, Hawkins KA, et al. Light to moderate alcohol consumption is associated with better cognitive function among older male veterans receiving primary care. *Journal of Geriatric Psychiatry and Neurology* 2006; 19: 98-105.